

CLAIMS

1. Process for the valorisation of metal values in a Zn-, Fe- and Pb-
5 bearing residue, comprising the steps of:
- subjecting the residue to a flash or agitated bath fuming step,
thereby producing an Fe-bearing slag and Zn- and Pb-bearing fumes;
and
- extracting the Zn- and Pb-bearing fumes and valorising Zn and Pb;
10 characterised in that either one or more of CaO, SiO₂ and MgO are
added as a flux before or during the fuming step so as to obtain a
final slag composition with:
$$\frac{[\text{Fe}]}{[\text{SiO}_2]} + \frac{[\text{CaO}]}{[\text{SiO}_2]} + \frac{[\text{MgO}]}{3} > 3.5;$$
$$0.1 < \frac{[\text{CaO}]}{[\text{SiO}_2]} < 1.3; \text{ and}$$
$$6 < [\text{SiO}_2] < 22,$$

all concentrations being expressed in wt%.
- 15 2. Process according to claim 1, wherein the Zn-, Fe- and Pb-bearing
residue is a neutral leach residue or a weak acid leach residue.
3. Process according to claim 2, characterised in that only one or
20 both of dolomite and limestone are added as a flux.
4. Process according to any one of claims 1 to 3, characterised in
that the concentration of MgO in the final slag is less than 5 wt%.
- 25 5. Process according to one of claims 1 to 4, characterised in that
the Zn-, Fe- and Pb-bearing residue contains Cu and precious metals,
and that, during the fuming step, a matte or alloy is produced
containing a significant part of the Cu and a significant part of the
precious metals.
- 30 6. Process according to any one of claims 1 to 5, characterised in
that the Zn-, Fe- and Pb-bearing residue contains Ge, that a major
part of the Ge is fumed together with Zn and Pb, and that it is
subsequently separated.
- 35 7. Process according to claim 6, whereby the separation of Ge is
performed by co-precipitation with Fe hydroxide or by addition of
tannic acid.

8. Process according to any one of claims 1 to 7, whereby the process is performed in a reactor selected from the list consisting of a plasma flash furnace and a submerged lance furnace.

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9. Process according to any one of claims 1 to 7, whereby the fuming step is performed in a reactor containing a molten phase, and comprising one or more plasma tuyeres as heat and gas sources, said tuyeres being arranged such that the plasma is generated under the

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10. Single-chamber smelting and fuming reactor for treating Zn-bearing residues, said reactor being designed to contain a molten slag phase up to a determined level, said reactor comprising one or

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more plasma tuyeres as heat and gas sources, said tuyeres being arranged such that the plasma is generated under said level.

11. Single-chamber smelting reactor according to claim 10, characterised in that the peripheral walls of the reactor are water-cooled.

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